

## SOME NEW INDIAN LITHOBIIDAE.

BY

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(With 4 text figures)

While serving in India I have been able to make a small collection of *Myriapoda*, first around Dehra Dun, U.P., and then in Bundelkhand, C.I. It will readily be understood that service in the Army makes it difficult to investigate the collection adequately, and up to this time I have been able to consider only the *Lithobiidae*. The results are, however, of sufficient interest to merit a short note.

As late as 1892, Pocock stated<sup>4</sup> that none of this family had been recorded from India, although in 1890-91 he published an account<sup>3</sup> of two new species from Burma. In 1917 Silvestri<sup>5</sup> described four species and a variety of *Lithobius* from India (Assam, Darjeeling, N. Bengal and N. W. F. Province), and a new species of Henicopidae from Trichinopoly. His list did not include *Lithobius sculpturatus* which had been described<sup>6</sup> in the meanwhile by Pocock from Kodaikanal and Madras.

In his paper, Silvestri stated that although the fauna of India seemed to be poor in *Lithobiidae*, he considered that collecting in temperate regions would probably yield new forms. The truth of this is borne out by the following paper, although two of the present species come from a region which is scarcely temperate. It is worth noting, however, that both of these were taken under stones within 50 feet of the edge of a lake, and that one, *Lamyctes liani*, was found there only for a few days during the monsoon rains, and that the other *Archilithobius birmanicus* var. *chandellensis* could not be rediscovered after the winter rains had ceased. It would appear that both are very sensitive to humidity.

I wish to express my gratitude to the following gentlemen: Mr. J. C. M. Gardiner, Mr. A. E. Foot, Lt-Col. J. Steel Harvey, I.A., Dr. S. Higginbottom and above all, to Dr. Bains Prashad.

### LITHOBIIDAE.

#### *Lithobiinae.*

#### *Archilithobius glenniel* sp. n. (Fig. 1 a-k)

Colour greenish-brown above, head and posterior segments of a more reddish hue, tergites somewhat mottled, legs and underside pale. Surface finely granulate.

Tergites 1, 3, 5 with postero-lateral corners rounded, posterior margin slightly emarginate; 2, 4, 6 short, posterior margin straight; 7 with subrectangular corners and posterior margin straight or slightly convex; 8, 10, 12, 14 tapering towards the rear, angles rounded, emarginate behind; 9, 11, 13 with posterior margin straight. Terminal segment rather semi-circular in outline, posterior margin only feebly emarginate. A distinct marginal furrow visible in tergites 1, 3 and 5 is less clear in succeeding segments.

Head slightly longer than broad; marginal furrow parallel to posterior margin. Ocelli seven in number arranged as in the figure. (In the Dehra Dun specimens there appear to be 8 ocelli.)

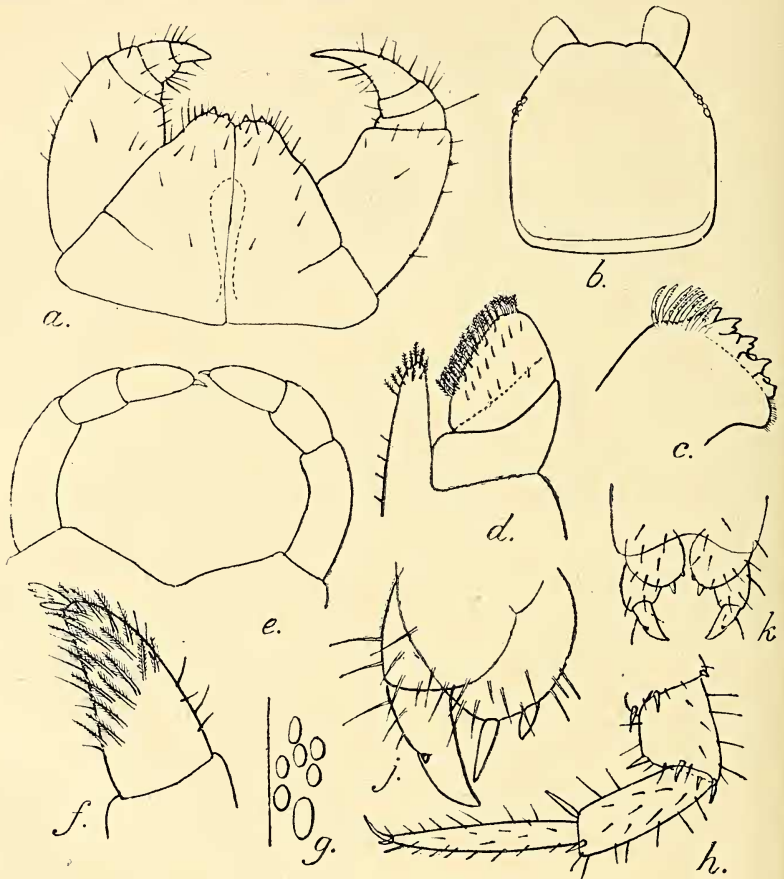


Fig. 1. *Archilithobius glenniei*.

(a) Forcipules (out claw undergoing regeneration); (b) head; (c) mandible; (d) 1st maxilla; (e) 2nd maxilla; (f) 2nd maxilla last segment; (g) ocelli, left side; (h) P. 1. distal part; (i) genital appendages of female; (k) genital Chakrata specimen.

Antennae: 20-23 segmented, setose, 10th segment  $1\frac{1}{2}$  times as long as broad, last segment twice as long as broad.

Mandibles of the usual form.

1st Maxilla: outer lobe fringed with about 23 plumose setae arranged in a double row; inner lobe surmounted by a dozen smaller plumose setae.

2nd Maxilla: terminal segment about twice as long as broad with some 30 plumose setae on the anterior face and non-plumose setae elsewhere. Claw with two spines and a small secondary claw.

Forcipules with 2+2 teeth and an additional seta on each side; precoxa narrowed distally, external margin concave.

Spinulation is of doubtful diagnostic value on account of the variation—which obtains—the opposite sides of the same specimen are occasionally found to be differently armed. For instance, the coxae of P 14 and P 15 of all specimens, bear a single spine, yet on one side of one specimen, two spines

arise from a common base. The most usual armature, however, is as follows:

P. 1.  $\frac{0\ 0\ 1\ 2\ 1}{0\ 0\ 2\ 2\ 1}$  and P. 14.  $\frac{1\ 0\ 3\ 2\ 0}{0\ 1\ 3\ 2\ 1}$ . Only a single P. 15 was found

and it was armed thus:— $\frac{1\ 0\ 3\ 1\ 0}{0\ 1\ 3\ 2\ 1}$ . A minute secondary claw was present on all these appendages.

Genital appendages—female: external claw robust with the outer margin sinuate and a distinct tooth about midway. Internal lobe with two teeth, the outer about as long as the inner, but both robust. In the specimen from Chakrata, the inner tooth is less than half the size of the outer.

Genital appendages—male: rudimentary.

Coxal pores: 2 (or 3); 4; 4; 4 (or 3) small, circular.

Length: 11 mm.

Locality: 1 ♀ Mussoorie: under stone, shady 23: 11: 42. 7,000 ft.

2 ♂♂ Dehra Dun: under stone. Sept. 42. 2,200 ft.

1 ♀ Chakrata, from cave named Moila No. 2. Collected by

Brig. E. A. Glennie. May 43.

This species is closest to *L.(A). tactus* Silv. and *L.(A). erraticulus* Silv. from Chitral (N.W.F. Province). From the former, it can be distinguished by (1) the fewer ocelli, (2) fewer coxal pores, (3) the form of the genital appendages of the female. The present species differs from *L.(A).erraticulus* in the following characters: (1) more numerous coxal pores; (2) the tarsi of P. 1-12 are not biarticulate as Silvestri<sup>6</sup> claims those of his species to be, although a pale transverse line is sometimes discernible across the mid-line of the tarsus; (3) the genital appendages of the female are of a different form—Silvestri makes no mention of the very conspicuous tooth on the outer margin of the external claw.

I have pleasure in naming this species after Brig. E. A. Glennie, D.S.O. The specimen taken by him from the Moila cave at Chakrata certainly belongs to this species in spite of the small deviation in the form of the female genital appendage referred to above. The chance migration of such lucifuge creatures into such an environment is not surprising.

#### *Archilithobius* sp. (Fig. 2 a-b)

Colour dark brown above, lighter beneath, head and last tergite orange; each tergite with the posterior border and middle line darker.

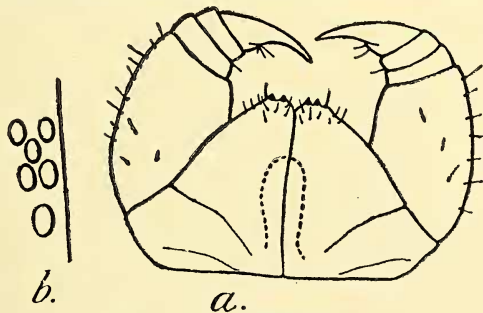


Fig. 2. *Archilithobius* sp.

(a) Forcípules; (b) Ocelli right side.

Tergites similar in form to *A. glenniei*.

Head broader than long, furrow parallel to posterior margin.

Ocelli: six, arranged as shown.

Antennae and mouth parts as for *A. glenniei* except that the last segment of 2nd maxilla has fewer plumose setae.

Forcípules: anterior margin convex, 2+2 teeth and seta; claw short.

Spinulation: P. 1.  $\frac{0\ 0\ 1\ 2\ 1}{0\ 0\ 2\ 2\ 1}$ ; P. 14.  $\frac{1\ 0\ 3\ 1\ 1}{0\ 1\ 3\ 2\ 1}$ ; P. 15. missing. P. 1. and

P. 14 both have a small secondary claw. Coxae of P. 14 and P. 15 dorsal spine.

Genital appendages—male: rudimentary.

Coxal pores: 2; 3; 3; 3.

Length: 9.0 mm.

Locality.—A single specimen (male) of a species of *Archilithobius* was forwarded to me by Brig. Glennie. It was taken by Lt.-Col. G. N. Osmaston, R.E., near the top of Harimukh Mountain, Kashmir, at a height of 16,000 ft. in July 1943.

This specimen differs from *A. glenniei* in (1) the form of the head, (2) number of ocelli, (3) shape of forcipules and (4) number of coxal pores. From *A. erraticulus* Silv. it can be distinguished by (1) the fewer ocelli, (2) the form of the forcipules and (3) the presence in all legs of an undivided tarsus. Until further material is available it would be unwise to state anything more definite than that the example does not fit in with any previously described species.

*Archilithobius birmanicus* var. *chandellensis* nov. (Fig. 3 a-f)

Colours Reddish-brown above, last tergite and underside paler. Surface rugose.

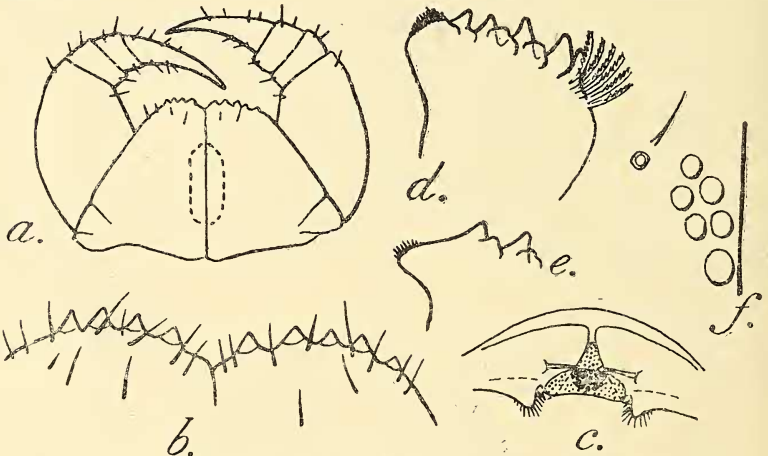


Fig. 3. *Archilithobius birmanicus* var. *chandellensis*.

(a) Forcipules; (b) Forcipules teeth; (c) labrum (foreshortened); (d) mandible; (e) mandible, another specimen; (f) ocelli, right side.

Tergites 1, 3, 5 with rounded postero-lateral corners, feebly emarginate; 2, 4, 6, 7 subrectangular with posterior margin straight; 8, 10, 12, 14 somewhat emarginate, with rounded corners and lateral margins increasingly convergent towards the rear; 9, 11, 13 straight, corners rectangular, not sharp. Head longer than broad; posterior marginal furrow broader in mid-line. Ocelli not very clear in the specimens examined; apparently 6 in number, arranged as in figure.

Antennae.—19-20-segmented, moderately setose, last segment 3 times as long as broad, 10th segment  $1\frac{1}{2}$  times as long as broad.

Mandibles normal, teeth robust, with setose rectangular process on inner face. This process is, however, much reduced in another example.

1st Maxilla with about 15 plumose setae on the inner margin of the outer lobe and numerous plumose setae on the inner lobe.

2nd Maxilla.—Last segment with less than 20 plumose setae and furnished with a single claw with 3 processes.

Forcipules with broad, convex precoxa bearing 5+5 teeth (in one specimen 5+4); claw slender.

Spinulation.—P. 1.  $\begin{matrix} 0 & 0 & 3 & 1 & 1 \\ 0 & 0 & 1 & 2 & 1 \end{matrix}$ ; P. 14.  $\begin{matrix} 1 & 0 & 3 & 1 & 0 \\ 0 & 1 & 3 & 3 & 0 \end{matrix}$ ; P. 15.  $\begin{matrix} 1 & 0 & 2 & 1 & 0 \\ 0 & 1 & 3 & 2 & 0 \end{matrix}$

P. 14. and P. 15. have each a small secondary claw; part of limb distal to tibia with abundant small pores.

Genital organs of male rudimentary.

Coxal pores.—2 (or 3); 4; 4; 3.

Length.—8.0 mm.

Locality.—margin of Dhubelatal, near Nowgong (Bundelkhand), under stones, moist, with grass around. Jan. 43. 6 specs.—all male.

Of the species recorded previously from the Indo-Australian region, only *A. sumatranus* Silv. and *A. birmanicus* Poc. have more than 3-4 teeth on the forcipules. The former has 7 and the latter 5-6. The present species is very close to *A. birmanicus*,—antennae, ocelli, tergites and coxal pores all agree with Pocock's description<sup>3</sup> which is brief and without figures. The chief points of difference are the number of teeth on the forcipules and the ventral armature of P. 15. (given as 1, 1, 1, 0, which I take to be 0, 0, 1, 1, 1, in the usual notation). As I have not seen the Burma specimens, and as there is no female in the present collection, I consider it more prudent to regard my specimens, for the time being at least, as belonging to a variety of *A. birmanicus*. Further collecting will no doubt elucidate the affinities of these species.

#### HENICOPINAE.

Attems lists 4 species and 1 variety of the genus *Lamyctes*:

- (1) *L. africana* (Poc.)—S. W. Australia, Caffraria, Capland, Cameroons, St. Paul.
- (2) *L. albipes* (Poc.)—Java.
- (3) *L. emarginata* (Newp.)—New Zealand.
- (4) *L. fulvicornis* Mein.—S. W. Australia, Europe, N. America, E. Africa.
- (5) *L. fulvicornis* var. *hawaiiensis* Silv.—Hawaii, Kona.

The genus has not previously been recorded from India.

#### *Lamyctes liani* sp. n. (Fig. 4 a-j)

Colour reddish-brown; antennae, anterior part of head and hindmost tergite orange-brown. Underside pale. Surface finely granulate.

Tergites 1, 3, 5 with rounded postero-lateral corners, very slightly emarginate; 2, 4, 6, 7 with posterior corners sub-rectangular, posterior margin straight; 8, 10, 12, 14 with rounded posterior angles, distinctly emarginate, segments converging posteriorly; 9, 11, 13 with posterior margin straight. All tergites with a distinct marginal furrow.

Head about as broad as long; marginal furrow parallel to posterior margin.

Ocelli single, large, with purple pigment. [Traces of the same pigment were to be found scattered throughout the body, which is interesting in view of the fact that Chamberlin refers to the presence of a similar pigment in *L. Dolichopus* from Salt Lake County, N. America (Chamberlin, R. V. Proc. U.S. Nat. Mus. XXIV No. 1270, p. 798)].

Antennae almost reaching the posterior border of the 5th tergite; 29 segments, covered with short setae; last segment slender, 3-4 times as long as broad; 10th segment considerably broader than long.

Mandibles with conspicuous tooth at inner distal angle.

1st Maxilla of usual type: outer lobe fringed with 20 plumose setae; inner lobe with about 6 non-plumose setae.

2nd Maxilla—last segment with about 13 plumose setae; single claw with two lateral spines. [In his conspectus of the genus, (Naturh. Tidsskr. (3), V. 1868. p. 266) Meinert states that the setae are simple. This is not so in this species].

Forcipules with broad precoxal region; external margin obtuse-angled and slightly concave; apical margin with 3+3 teeth, the outermost on each side being considerably smaller than the other two.

Spinulation.—P. 1.  $\frac{0\ 0\ 0\ 0\ 0}{0\ 0\ 0\ 0\ 0}$ ; P. 14— $\frac{0\ 0\ 0\ 0\ 0}{0\ 0\ 0\ 0\ 0}$ ; P. 15.  $\frac{0\ 0\ 0\ 0\ 0}{0\ 0\ 0\ 0\ 0}$

On P. 1, there is a pseudo-spine formed by an extension of the integument of the dorsal side of the prefemur. Coxae of P. 14. and 15. without spine.

P. 1, P. 14. and P. 15. with small secondary claw. Legs are covered with numerous setae, but no pores occur. P. 1-12 with undivided tarsus, P. 13-15 with two-segmented tarsus, but division is not always well-marked.

First leg-bearing segment with spiracle.

Genital organs—female; basal segment with 2 elongated teeth, the inner shorter than the outer; terminal claw narrowed distally, markedly curved and with a longitudinal incision on the inner side.

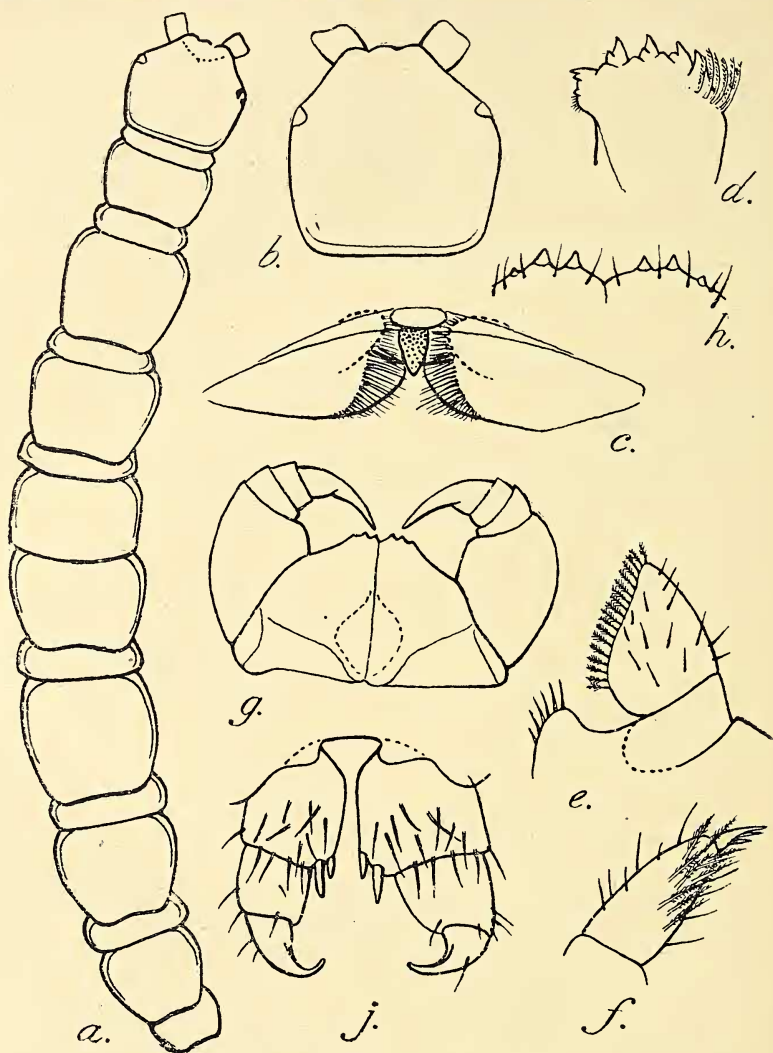


Fig. 4. *Lamycles liani* sp. n.

(a) entire; (b) head; (c) labrum; (d) mandible; (e) 1st maxilla; (f) 2nd maxilla, last segment; (g) forcipules; (h) forcipules, teeth; (j) genital appendages of female.

Coxal pores: 2; 2; 2; 2; or 3; 3; 3; 3.

Length—7.0-8.0 mm.

Locality—margin of Dhubelatal, near Nowgong. Under stones, moist gravel 21st and 24th July 43.

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## EXPLANATION OF FIGURES.

Fig. 1. *Archilithobius glennici*.—(a) Forcipules (one claw undergoing regeneration), (b) head, (c) mandible, (d) 1st maxilla, (e) 2nd maxilla, (f) last segment of 2nd maxilla, (g) ocelli—left side, (h) P. 1, distal region of limb, (j) genital appendages of female, (k) the same, specimen from Chakrata.

Fig. 2. *Archilithobius* sp.—(a) Forcipules, (b) ocelli—right side.

Fig. 3. *Archilithobius birmanicus* var. *chandellensis*.—(a) Forcipules, (b) teeth of forcipules, (c) labrum (foreshortened), (d) mandible, (e) mandible of another specimen, (f) ocelli—right side.

Fig. 4. *Lamyctes liani*.—(a) entire, (b) head, (c) labrum from below, (d) mandible, (e) 1st maxilla, (f) last segment of 2nd maxilla, (g) forcipules, (h) teeth of forcipules, (j) genital appendages of female.

## ANNOTATED LIST OF CROP PESTS IN THE BOMBAY PROVINCE.

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## INTRODUCTION.

Economic entomology is very intimately associated with the crop production, therefore some knowledge of the more important pests is of the greatest significance. In the province of Bombay however, much attention could not be devoted to the study of various pests since the staff engaged was small and mostly occupied in teaching. Nevertheless, it has now been realised that the first essential necessity is to determine the identity and the activities of the insect foes, responsible for damaging our crops. The present publication therefore, aims at supplying such information to cultivators, garden-owners, district workers, propaganda officers, the revenue authorities, and also to students in the Agricultural College